

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with § 1.6(a)(4).

Dated: December 13, 2011  
Electronic Signature for Nicholas J. DiCeglie, Jr.: /Nicholas J. DiCeglie, Jr./

Docket No.: 59894US(49991)  
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of:  
John E. O'Gara

Application No.: 10/587,598

Confirmation No.: 3666

Filed: April 27, 2007

Art Unit: 1766

For: POROUS HYBRID MONOLITH MATERIALS  
WITH ORGANIC GROUPS REMOVED FROM  
THE SURFACE

Examiner: R. S. Loewe

**REMARKS/ARGUMENTS IN SUPPORT OF  
PRE-APPEAL BRIEF REQUEST FOR REVIEW**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

Applicants are in receipt of the final Office Action dated July 13, 2011 (the "Office Action"), and now request review of the Office Action. A Notice of Appeal and a Petition for Extension of Time for two (2) months are filed herewith. The following remarks support Applicants' "Pre-Appeal Brief Request for Review" filed herewith. These remarks do not exceed five pages, do not present amendments, and are being filed with a Notice of Appeal, thereby satisfying the requirements for review.

**The Office Action**

In the Office Action, Claims 1-3, 8-16, 20-34, 36, 52 and 53 have been rejected. Specifically, the Examiner has maintained the rejection under 35 U.S.C. 103(a) over U.S. Patent No. US 6,528,167 to O'Gara ("O'Gara") in view of Motokawa et al. J. Chromatography A, 961 (2002) 53-63 ("Motokawa").

The Examiner contends that O'Gara teaches and claims hybrid particles wherein said particles have an interior and exterior surface having the same composition as the instant claims. The Examiner further contends that Motokawa teaches silica monoliths comprising surface Si-CH<sub>3</sub> and Si-OH groups as well as surface modification of the surface silanol groups by continuously feeding a solution of octadecyldimethyl-N,N-diethylaminosilane under pressure. The Examiner contends that the cleavage and replacement of surface groups of O'Gara would be understood to be selective in that only chemically accessible Si-CH<sub>3</sub> groups on the surface of the particle or monolith react with the various reagents added thereto.

As such, the Examiner contends that one of ordinary skill in the art would have been motivated to utilize the methods of Motokawa to prepare monoliths from the materials of O'Gara and that the surface modifications to the monolith could be performed by feeding respective chemicals through the monolith to cause desired transformations.

Clear Error and/or Omission in the Final Office Action:

The O'Gara reference in combination with Motokawa does not render the present claims obvious.

As discussed in Applicant's previous responses: monolithic materials are complex materials to make and are prepared by a process that is very different from the process by which porous particles are prepared.

O'Gara does not disclose porous monolithic materials. Motokawa relates to monolithic silica capillary columns that are prepared from TMOS and MTES.

According to the Examiner, the Motakawa columns are surface modified by continuously feeding a solution of octadecyldimethyl-N,N-diethylaminosilane. Both Motokawa and the Examiner admit the addition of octadecyldimethyl-N,N-diethylaminosilane is a surface

modification. That is, the octadecyldimethyl-N,N-diethylaminosilane adds directly to the surface of monolith with no selectivity.

In a typical hybrid monolith, the environment and distribution of hybrid groups is the same on the inside matrix of the monolith (e.g., the non-accessible surface) and the surface layer. The claimed application of oxidative cleavage of hybrid monoliths allows for a differentiation of hybrid content. That is, there is a loss of hybrid groups on the accessible surface, while the environment and distribution of hybrid groups on the inside matrix of the monolith remain unmodified. This process produces a fundamentally different material that allows for the improvements in chemical stability of the hybrid groups on the inside matrix, while have a surface layer that is more silica like – allowing processing and chromatography similar to a silica monolith.

Motokawa only teaches the surface functionalization of silanol groups. Applicant contends that the use of optimized oxidative cleavage is far different than silanol functionalization. First, the chemicals used for silanol modification are often chlorosilanes or aminosilanes, base and a anhydrous solvent (e.g., toluene). Oxidative cleavage of a silicon-carbon bond is more complicated. The chemicals used to oxidatively cleave a silicon-carbon bond are potassium fluoride and hydrogen peroxide in a mixture of potassium hydrogencarbonate, methanol, tetrahydrofuran and water. The end result of a silanol surface modification with an octadecylsilane is an increase in surface organic content, and an increase in surface layer hydrophobicity, whereas the end result of oxidative cleavage is a loss in surface organic content, and an increase in surface hydrophobicity.

The Examiner contends that one of ordinary skill in the art would have been motivated by the particles of O’Gara to maintain similar surface concentrations on a monolithic material. However, as previously argued, the Examiner fails to demonstrate how one of ordinary skill in the art would achieve selective replacement of surface groups on a monolith by the combination of O’Gara and Motokawa (“the proposed O’Gara/Motokawa monolith”).

O’Gara teaches oxidative cleavage of particles to replace surface Si-CH<sub>3</sub> groups to Si-F groups and then to Si-OH groups. Nothing in Motokawa teaches or suggests the oxidative cleavage

of surface groups of a monolith. As such, in order to achieve the surface modification of Motakawa, one of ordinary skill in the art would need to start by performing the oxidative cleavage methods of O’Gara.

According to O’Gara, the oxidative cleavage of the hybrid particles is performed using standard equipment (e.g., glassware and magnetic stir bars). However, one of ordinary skill will readily recognize that hybrid monoliths are considerably more fragile than their particulate counterparts. Indeed, Example 4 of the instant application states: “Care was taken to keep the rods separated from each other and the magnetic stirring bar in order to avoid monolith breakage.”

One of ordinary skill in the art would readily appreciate that subjecting a monolith to the conditions of O’Gara would cause the monolith to shatter or break. As such, the end result of using the process of O’Gara on hybrid monoliths would be the formation of oxidatively cleaved particulate material which would be ill-defined in morphology and particle size. In other words, O’Gara effectively teaches away from the claimed methods which emphasize the care needed to maintain the monoliths. As such, even if one were to utilize the methods of O’Gara, there would have been no reasonable expectation of success in achieving the materials of the claimed invention.

The Examiner contends that the surface modifications to the proposed O’Gara/Motokawa monolith could be performed by feeding respective chemicals through the monolith to cause desired transformations. However, as discussed above, nothing in Motokawa describes the selective, oxidative cleavage and replacement of surface groups. Furthermore, nothing in Motokawa teaches the claimed surface concentrations. Even assuming, *arguendo*, that the feeding of chemicals through the proposed O’Gara/Motokawa monolith as described by Motokawa would result in a material that formulaically resembles the claimed invention, nothing in Motokawa would suggest that the surface groups would be present in the claimed surface concentrations. Indeed, as Applicant has previously discussed, such concentrations are only achieved by the selective cleavage and replacement of surface silicon-carbon groups as described by the Applicant’s invention. As such, Applicant contends that the Examiner has failed to make out a *prima facie* case of obviousness as

the combination of O'Gara and Motokawa neither teaches nor suggests each and every element of the claims.

Applicant contends that nothing in Motokawa suggests the ability to selectively cleave silicon-carbon groups. At best, the combination of O'Gara and Motokawa would suggest the surface modification of surface silicon-hydroxyl groups, if present, in a non-selective manner. As such, one of ordinary skill in the art would have had no reasonable expectation of success in achieving the selective replacement of surface groups using the methods of Motokawa on the materials of O'Gara.

Applicant contends that one of ordinary skill in the art would not find the instant claims obvious in light of O'Gara in combination with Motokawa.

### **CONCLUSION**

Applicant respectfully requests reconsideration and withdrawal of the rejections of Claims - 3, 8-16, 20-34, 36, 52 and 53.

For at least the foregoing reasons, Applicant contends that the rejections of record should be withdrawn, and that the present application is in condition for allowance. Early and favorable consideration of the application is earnestly solicited.

The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 04-1105, under Order No. 59894 (49991).

Dated: December 13, 2011

Respectfully submitted,

Customer No. 48990

Electronic signature: Nicholas J. DiCeglie, Jr./  
Nicholas J. DiCeglie, Jr  
Registration No.: 51,615  
Edwards Wildman Palmer LLP  
P.O. Box 55874  
Boston, Massachusetts 02205  
(212) 308-4411  
Attorneys/Agents For Applicant

<b>PRE-APPEAL BRIEF REQUEST FOR REVIEW</b>		Docket Number (Optional) <b>59894(49991)</b>	
		Application Number <b>10/587,598-Conf. #3666</b>	Filed <b>April 27, 2007</b>
		First Named Inventor <b>John E. O'Gara</b>	
		Art Unit <b>1766</b>	Examiner <b>R. S. Loewe</b>

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).

Note: No more than five (5) pages may be provided.

I am the

applicant /inventor.

/Nicholas J. DiCeglie, Jr./

Signature

assignee of record of the entire interest.

See 37 CFR 3.71. Statement under 37 CFR 3.73(b)  
is enclosed. (Form PTO/SB/96)

Nicholas J. DiCeglie, Jr.

Typed or printed name

attorney or agent of record.

Registration number 51,615

(212) 308-4411

Telephone number

attorney or agent acting under 37 CFR 1.34.

Registration number if acting under 37 CFR 1.34. \_\_\_\_\_

December 13, 2011

Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required.  
Submit multiple forms if more than one signature is required, see below\*.



\*Total of 1 forms are submitted.

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with 37 CFR § 1.6(a)(4).

Dated: December 13, 2011

Electronic Signature for Nicholas J. DiCeglie, Jr.: /Nicholas J. DiCeglie, Jr./